APR 23 1984
0830-H-05
COMPLETED
25
NAS 1.53:OSSA-1-84
OCLC #10859980
ES 6-19-84

NASA
National Aeronautics and Space Administration

PSN
PIANO SPAZIALE NAZIONALE

362

Announcement of Opportunity

ORIGINAL

Tethered Satellite System

A.O. NO. OSSA-1-84
APRIL 15, 1984

BEST COPY AVAILABLE

ANNOUNCEMENT OF OPPORTUNITY

FOR

TETHERED SATELLITE SYSTEM

AO No. OSSA-1-84 April 15, 1984

I. DESCRIPTION OF THE OPPORTUNITY

The United States National Aeronautics and Space Administration (NASA), and the Piano Spaziale Nazionale of the Consiglio Nazionale Delle Ricerche of Italy (PNS/CNR) jointly announce an opportunity for participation in the first three flights of the Tethered Satellite System (TSS) on the Space Shuttle. These flights are expected to occur between 1987 and 1990. The TSS is comprised of two major elements, the Deployer, to be supplied by NASA, and the Satellite, to be provided by PSN/CNR. In addition, it is the intention of NASA and PSN/CNR to supply two items of core equipment for these flights; a three-axis accelerometer, placed on-board the Satellite, and an electron gun, to be mounted on the Deployer. Science instrumentation can be accommodated on both the Deployer and the Satellite. To be considered for selection, a proposed investigation, either theoretical or experimental, must make use of the unique scientific opportunity provided by the flight of the TSS. The principle purpose of the TSS missions is to carry out scientific investigtions in regions remote from the Space Shuttle Orbiter.

NASA will (a) provide overall systems engineering and integration for the TSS, including the Deployer, the Satellite, science instruments, flight support equipment, ground support equipment, and software; (b) design, fabricate, and test the TSS Deployer, including the tether materials, and associated ground and flight support equipment; and (c) assure development of instruments for flight on the joint missions from proposals submitted by Principal Investigators from the USA and non-European States. PSN/CNR will (a) design, fabricate, test and deliver for integration with the Deployer, a modular, reusable Satellite and associated ground and flight support equipment; and (b) assure development of instruments selected for flight on the joint missions from proposals submitted by Principal Investigators from European States. The Marshall Space Flight Center (MSFC) has been designatd as the project management center for NASA.

On the first flight of the TSS, currently planned for late 1987, the Satellite will be deployed upward on a conducting tether to a distance of 20 km from the Space Shuttle. The objectives of the first flight are to verify the controlled deployment, operation and retrieval of the tethered satellite and to carry out scientific investigations in the general areas of tether dynamics, studies of spacecraft environment, and space plasma physics.

BEST COPY AVAILABLE

The second and third flights are planned to take place at eighteen-month intervals after the first. For purposes of planning and cost estimating, it should be assumed that for the second flight the Satellite will be deployed downward to a maximum distance of 100 km from the Orbiter, and that for the third flight the Satellite will be deployed upward a distance of 20 km on a conducting tether. These missions will conduct experiments primarily in the areas of space plasma, atmospheric, geomagnetic, and earth gravity physics.

This Announcement solicits theoretical and experimental proposals for the definition and development of investigations for the first three flights of the TSS and for the analysis and interpretation of data gathered by the instrumentation during the missions. At this time, funding is available only for the first flight. Thus, only investigations chosen for the first flight are candidates to proceed to the development phase. It is anticipated that approximately five to ten investigations will be approved for the first flight. Investigations chosen for the second and third flights will be selected for a definition phase only, with plans to proceed to the development phase 36 months before launch, should funding become available. This Announcement does not constitute an obligation on the part of the U.S. or the Italian Governments to provide funds for the second and third flights.

Principal Investigators whose investigations have been selected as a result of this solicitation will form an Investigators Working Group (IWG). The IWG will perform two functions. First, the IWG will meet as a whole to provide advice to NASA and PSN/CNR on the overall design and development of the TSS. Second, the IWG will be split into specific mission teams to work with NASA and PSN/CNR to define optimized mission profiles and experiment sequences, and to specify the data acquisition, processing, handling, and dissemination for each of the three missions. The overall IWG will be jointly chaired by the PSN/CNR and NASA (MSFC) project scientists, and will meet approximately once a quarter. Investigators should assume that the meeting sites will alternate between the U.S. (Huntsville, Alabama) and Italy (Torino). Specific plans for the individual mission teams will be worked out during the early part of the overall definition activities.

II. ANNOUNCEMENT OBJECTIVES

To be selected, proposals submitted in response to this Announcement for the first flight must address one or more of the following objectives:

- To determine and understand the electrodynamic interaction between the tether/satellite/orbiter system and the ambient space plasma.
- To investigate and understand the dynamical forces acting on a tethered satellite.

BEST COPY AVAILABLE

For the second and third flights, investigations in the fields of atmospheric, ionospheric, and space plasma physics and geodynamics will be emphasized. However, well-conceived investigations in other disciplines will be considered. In all cases, investigations must make use of the unique characteristics of the TSS to be considered for selection.

III. BACKGROUND

A. INTRODUCTION

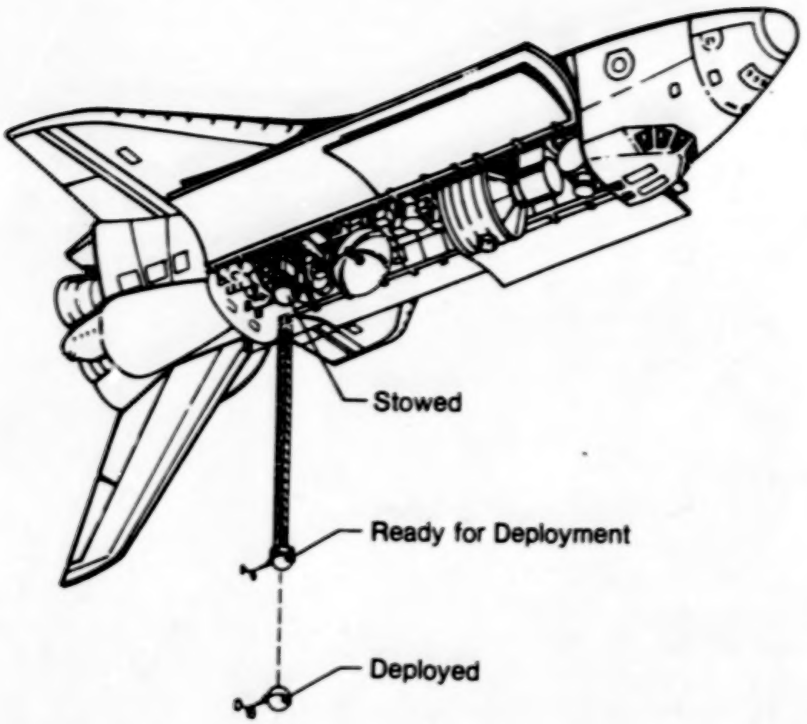
The concept of extending a tethered satellite from the Space Shuttle for scientific purposes was first put forward in 1974 by Colombo et al (Reference 1). The concept was later endorsed by the Atmospheric, Magnetospheric and Plasmas in Space (AMPS) Science Definition Group, established by NASA in 1975. After 1974, other uses of such a system for scientific research were suggested. A workshop on the "Uses of a Tethered Satellite System" was held in 1978, and, in addition to the areas discussed by the AMPS Science Definition Group, considered geomagnetic and gravity studies (Reference 2). In 1979, a TSS Facility Requirements Definition Team was formed by the NASA Office of Space Science to consider both the scientific merit of the possible uses of the TSS, and to assess the technical requirements such uses would impose upon the design of the facility. A report detailing the findings of this team was published in 1980 (Reference 3). An addendum to this report was issued in 1983 (Reference 4). Copies of these documents will be sent to proposers on receipt of a Letter of Intent (see Section IV B).

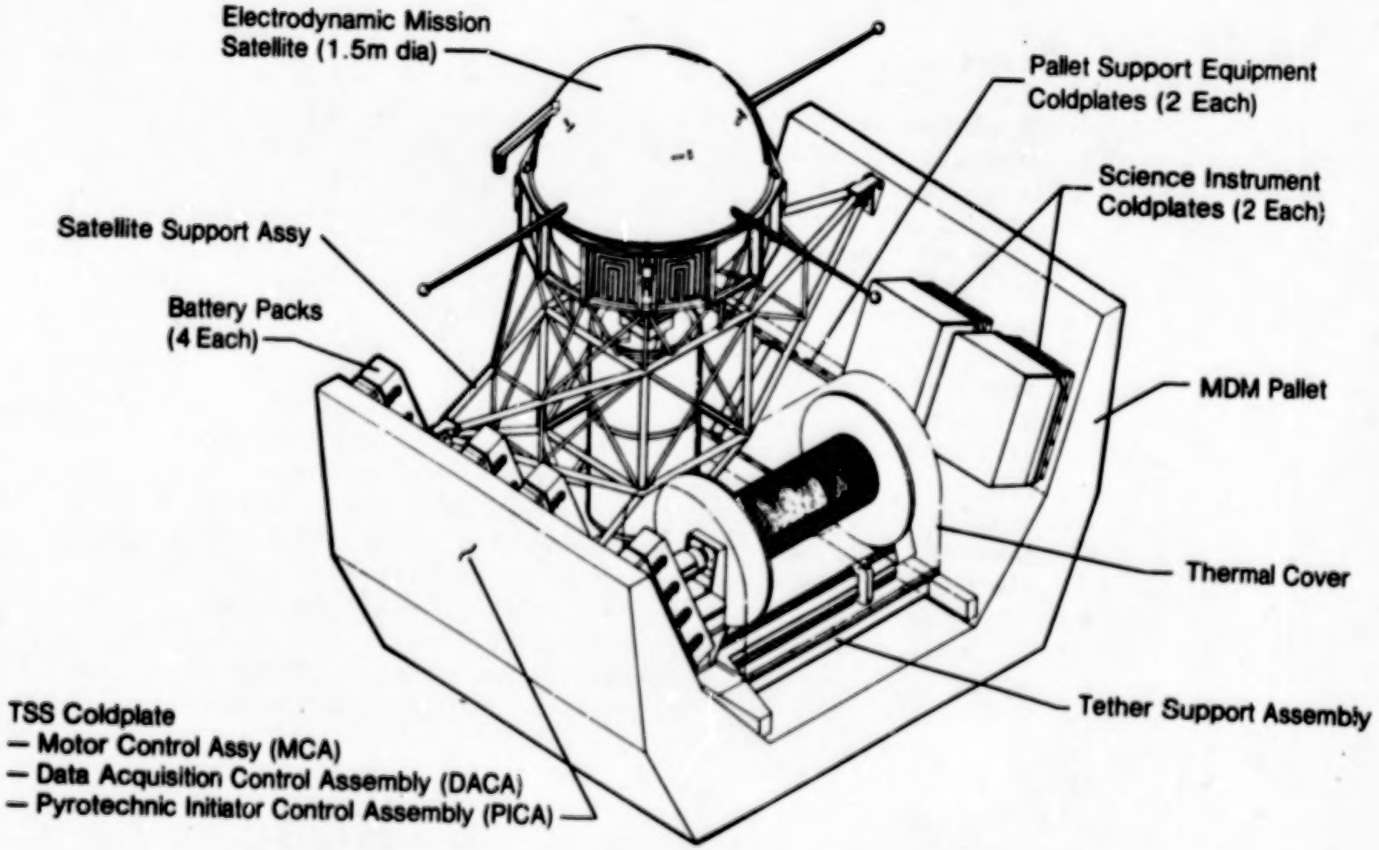
B. MISSION PLAN

Two operational modes will be available to the investigators. In one, the Satellite will be deployed above the Shuttle Orbiter to a distance of up to 20 km. The tether will contain an insulated, electrically conductive wire with a maximum resistance of 0.2 Ohms per meter. In the other, the Satellite will be deployed downward on a non-conducting tether to a maximum distance of 100 km. In either operational mode, selected TSS parameters and science data will be displayed at the aft flight deck of the Space Shuttle to permit active control of both the TSS and the science instruments. Payload specialists will be available to perform specific functions as required by the investigators.

The baseline TSS mission duration is 36 hours, of which approximately 16 hours will be spent on station. Limited science operations may be carried out during the deployment and the retrieval periods (see Section III C 2). It is the intent of PSN/CNR and NASA to allocate experiments to the flights on the basis of scientific balance, and availability of resources.

BEST COPY AVAILABLE




Electrodynamic Mission Satellite (1.5m dia)
Pallet Support Equipment Coldplates (2 Each)
Science Instrument Coldplates (2 Each)
Satellite Support Assy
Battery Packs (4 Each)
MDM Pallet
Thermal Cover
Tether Support Assembly
TSS Coldplate
— Motor Control Assy (MCA)
— Data Acquisition Control Assembly (DACA)
— Pyrotechnic Initiator Control Assembly (PICA)

TSS-Deployer and Deployment Concept

BEST COPY AVAILABLE

C. TETHERED SATELLITE SYSTEM

1. The Deployer

The Deployer consists of a Spacelab pallet, a support structure and deployment mechanism, an extendible/retractable boom for initial deployment and final retrieval of the Satellite, an electrical power and distribution subsystem, a communications and data management subsystem, and a tether and tether control capability. The Deployer has the capability to handle either conducting or non-conducting tethers of up to 100 km in length. Standard services are provided by the Orbiter as required. The Satellite will be structurally restrained by the Deployer for all mission phases except during deployed operations. Science instruments can be installed on the Deployer.

Electrical power for the Deployer during prelaunch periods will be supplied by the ground or by the Orbiter. During Orbiter flight, electrical power will be supplied by the Orbiter and/or Deployer internal power sources. Emergency power sources will be provided to assure release/jettison of the TSS boom and satellite to ensure the safety of the Orbiter and crew. The Deployer will provide power conditioning and distribution equipment for regulated DC power, and single- and three-phase AC power. The Deployer will also provide and distribute the required power for the Satellite during the period that it is electrically attached to the Deployer.

The Communications and Data Management Subsystem (CDMS) will include equipment necessry to receive, transmit, and process data and commands required for control of the TSS and acquisition of engineering and scientific information. The CDMS design will provide command and data interchange capability between the Deployer and Satellite during the entire TSS mission. Control instrumentation, data acquisition, and command decoding capability will also be provided. Engineering instrumentation will be provided to monitor and evaluate performance, operation, environment, and Satellite attitude. Manual control and monitoring of the TSS will be provided by the Orbiter Control and Display System. Controls and displays of TSS systems and science instruments will be provided in the Orbiter aft flight deck.

The TSS design will provide support accommodations on the Deployer for science experiments on each mission. An electron gun, capable of drawing a current of up to one ampere along the conducting tether, and mounted on the Deployer, will be supplied by NASA and PSN/CNR for the use of the experimenters. An allowance has been made for

BEST COPY AVAILABLE

up to 100 kilograms of science experiments on the Deployer. Approximately one kilowatt of power and 100 kilobits per second of telemetry will be available for these experiments. Active thermal control, and 28-volt DC power can be provided to the Deployer scientific instruments. The TSS CDMS will provide command and data exchange between experiments and the Shuttle.

2. Satellite

The Satellite is spherical with a diameter of 1.5 meters. The upper hemisphere will house the scientific payload, while the lower hemisphere contains the support equipment. The Satellite is equipped with cold gas (nitrogen) thrusters to be used for deployment, retrieval, and for attitude control. A fixed equatorial boom, one meter in length, will be provided to carry instruments. Two experimenter-supplied booms for electric field measurements can also be accommodated. These booms may be extendible or fixed, but must be no more that one meter in length in the stowed configuration. A three-axis accelereometer, capable of detecting changes in accelertion of 10^{-5} G and mounted in the spacecraft, will be supplied by NASA and PSN/CNR for the use of the experimenters.

It is expected that an average power of approximately 50 watts (28V DC) will be allocated to the experiments with a total capacity of 1900 watt-hours. The payload mass for an upward deployed science mission is approximately 66 kg; for a downward deployed mission it is 46 kg. Satellite telemetry will provide 64 input/output channels for analog, discrete and digital data. The maximum bit rate during station keeping will be 12 kb/s, while six kb/s will be available during deployment and retrieval.

The attitude of the spacecraft will be controlled in pitch, roll and yaw during station keeping. Four sun sensors and a set of three rate integrating gyros will provide the attitude sensing. In addition, the spacecraft on the downward mission will carry an earth sensor to back up the sun sensors. As presently envisioned, the spacecraft on the upward mission will spin about the tether axis at approximately one rpm. The spin phase will be determined to $\pm 1^{o}$. On the downward mission, the spacecraft yaw is expected to be controlled to within $+2^{o}$, and the overall determination of pitch, roll and yaw to be within $+0.3^{o}$.

BEST COPY AVAILABLE

IV. PROPOSAL OPPORTUNITY PERIOD

All proposals submitted in response to this Announcement are due at NAS and/or PSN/CNR at 1600 hours on July 20, 1984. NASA and PSN/CNR reserve the right to consider proposals received after this deadline if such an action is judged to be in the interest of the respective Governments. A complete proposal schedule is given in Section VIII.

V. REQUIREMENTS AND CONSTRAINTS

Raw data should be supplied to investigators within ninety days after the Shuttle mission is ended. Some data will be available in real-time during the mission for instrument performance assessment. The Principal Investigator will be responsible for providing data, in a form usable by other scientists, to be deposited with adequate documentation in the National Space Science Data Center, NASA Goddard Space Flight Center, within one year after the data are delivered to the Principal Investigator in usable form. It is planned to provide support for data analysis for the one-year period following receipt of data.

VI. PROPOSAL SUBMISSION INSTRUCTIONS

A. GENERAL

When more than one individual is associated with a proposal, one of the proposers must be identified as team leader or contact point and designated as Principal Investigator (P.I.). The country of the P.I.'s institution will determine the agency (PSN/CNR or NASA) to which the proposal should be submitted for scientific and technical evaluation, as indicated in Section VI B. The proposer is responsible for assuring that financial support for an investigation has been requested from all funding authorities who are expected to contribute to the support of that investigation.

B. LETTERS OF INTENT AND THE PROPOSAL INFORMATION PACKAGE

A Letter of Intent should be submitted by all intending proposers and should arrive at NASA or PSN/CNR by May 21, 1984. Letters should be addressed as follows:

- When the P.I. is from the U.S.A., the Letter of Intent should be sent to the following address at NASA:

  Dr. Robert D. Hudson
  c/o Code EPM-20 (Ref. AO No. CSSA-1-84)
  National Aeronautics and Space Administration
  Washington, DC 20546
  U.S.A.
  Telephone Number 202/453-1707
  TELEX 89530

BEST COPY AVAILABLE

- When the P.I. is from a European State, the Letter of Intent should be sent to the following address at PSN/CNR:

  Dr. P. Cecchini
  Piano Spaziale Nazional Del C.N.R.
  Viale Regina Margherita 202
  00185 Roma
  ITALY
  Telephone Number 06-850050
  TELEX 616162

- When the P.I. is from any country other than the U.S.A. or a European State, Letters of Intent should be sent to NASA at the above address with a copy to:

  International Affairs Division
  Attention: Code LID (AO-OSSA-1-84)
  National Aeronautics and Space Administration
  Washington, DC 20546
  Telephone Number 202/453-8452
  TELEX 89530

Notice of submission of Letters of Intent should be sent by telex to the appropriate agency. Copies of Letters of Intent should be sent at the same time to all authorities from whom funds will be sought. The letter should briefly describe the investigator's objectives and proposed instrumentation (if appropriate). The names, addresses, telephone numbers, telex numbers, and the affiliations of the Principal Investigator and his Co-Investigators should be listed.

The Proposal Information Package, which will be sent to prospective proposers on receipt of their Letter of Intent, will include the following documents:

- University of Alabama, Huntsville/NASA Workshop on the Uses of a Tethered Satellite System - May 1978.

- Tethered Satellite System: Facility Requirements Definition Team Report - April 1980.

- Addendum to Tethered Satellite System: Facility Requirements Definition Team Report - May 1983.

- TSS Description and Payload Accommodation Handbook, Latest Revision.

BEST COPY AVAILABLE

C. PROPOSALS

A uniform proposal format will be required from proposers to aid in proposal evalution and to facilitate comparative analysis. The proposal should be submitted in three sections: (1) Investigation and Technical Plan, (2) Management Plan, and (3) Cost Plan (not required for non-U.S. proposals). It must be signed by an institutional official authorized to certify institutional support, sponsorship, and management of the investigation and, for U.S. proposers, of the financial parts of the proposal. Fifteen copies of all sections of the proposal must be submitted. All documents should be typewritten and in English. One copy of each should be clear black, on white paper of a quality suitable for reproduction.

The Investigation and Technical Plan of the proposal should consist of a main body and optional appendices. The main body must be limited to a maximum of 20 single-spaced, typewritten pages without reduction, including illustrations, and may contain no more than two foldout pages. Appendices may be used to clarify technical details; but appended data, including illustrations, must not exceed in total twenty single-spaced typewritten pages without reduction. Appended data will not necessarily be considered during the proposal evaluation. Proposals should be as complete as possible and contain enough background to be meaningful to a reviewer who is generally knowledgeable in the field, but not necessarily a specialist.

Details of the proposal format are contained in Appendix A. Proposals should be mailed to the same addresses to which Letters of Intent were sent, as described in Section VI B above, except when the P.I. is from any country other than the U.S.A. or a European State. In this case, the proposal should be mailed to:

International Affairs Division
Attention: Code LID (AO-OSSA-1-84)
National Aeronautics and Space Administration
Washington, DC 20546

Where funding from non-U.S.A. or non-Italian authorities is required, proposals must be accompanied by a letter from the respective funding authorities attesting that the proposal has merit and is made with the knowledge and approval of those authorities. A guarantee of financial support, although desirable, is not mandatory at this stage, but must be received before a proposal can be selected for flight. Should such a proposal be selected by NASA or PSN/CNR, NASA or PSN/CNR will arrange with the appropriate sponsoring government agency for the proposed participation on a cooperative (no exchange of funds) basis, in which NASA or PSN/CNR and the sponsoring agency will each bear the cost of discharging its respective responsibilities.

BEST COPY AVAILABLE

VII. PROPOSAL EVALUATION, SELECTION, AND IMPLEMENTATION

A. EVALUATION AND SELECTION PROCEDURES

Proposals received by NASA and PSN/CNR in response to this Announcement of Opportunity will be reviewed by a joint group of scientific peers of the proposers. The purpose of this review is to assess the scientific and technical merit of the proposals in the context of this Announcement of Opportunity. Those proposals which are considered to have the greatest scientific merit will be further reviewed for engineering, management, cost and safety aspects by the NASA Project Office at MSFC and by PSN/CNR.

Following the scientific and technical evaluation described above, PSN/CNR and NASA will separately follow their normal review procedures. In the case of PSN/CNR, this will include consultation with its Scientific Committee. In NASA's case, a subcommittee of the Space Science and Applications Steering Committee will be appointed to categorize the proposals. Subsequent to these reviews, the NASA and PSN/CNR Program Offices will jointly recommend specific investigations for each mission.

Based on these recommendations, the NASA Associate Administrator for Space Science and Applications and the President of CNR will coordinate and jointly announce the selection of the investigations for the first three missions.

B. EVALUATION CRITERIA

The following criteria, listed in descending order of importance, will be used by NASA and PSN/CNR in evaluating individual proposals:

1. The scientific and technological merit of the investigation, including the topical importance of the investigation within the discipline to which it pertains, and the probability of acquiring meaningful results.

2. The relevance of the proposed investigation to the specific opportunity and to the established mission objectives (Section II).

3. The competence and relevant experience of the Principal Investigator and any collaborators as an indication of their ability to carry their investigations to a successful conclusion.

4. The adequacy of the proposed experimental hardware and technical plan to carry out the investigation.

BEST COPY AVAILABLE

5. The reputation and interest of the investigator's institution, especially from the point of view of whether the institution will provide necessary support, to insure that the investigation can be completed satisfactorily.

In addition to the criteria listed above, cost (for U.S. investigators only) and management factors will be considered separately in all selections. Management aspects include the time and attention the Principal Investigator plans to devote personally to the investigation. NASA and PSN/CNR may desire to select only a portion of a proposer's investigation, in which case the investigator will be given the opportunity to accept or decline such partial acceptance.

VIII. SCHEDULE

- o Announcement of Opportunity released on April 15, 1984
- o Letters of Intent due at NASA or CNR by May 21, 1984
- o Proposals due at NASA or CNR by July 20, 1984
- o Selection announcement during October 1984

IX. REFERENCES

1. Colombo, G., E. M. Gaposchkin, M. D. Grossi, G. L. Weiffenbach; "Shuttle-Borne Skyhook: A New Tool for Low Altitude Research," Smithsonian Astrophysical Observatory, Reports in Geoastronomy 1, September 1974.

2. "UAH/NASA Workshop on the Uses of a Tethered Satellite System," S. T. Wu, Editor, 1978.

3. "The Tethered Satellite System: Final Report of the Facility Requirements Definition Team," P. Banks, Chairman, Utah State University, May 1980.

4. "Addendum to Tethered Satellite System - Facility Requirements Definition Team Report," May 1983.

X. SUMMARY

The TSS will provide an important new facility for conducting space experiments in regions remote from the Space Shuttle. The ability to lower a satellite to altitudes as low as 103 km will enable scientists to make high resolution geomagnetic and gravity measurements, and to obtain global information on a region of the atmosphere that heretofore has been studies only from rocket and

BEST COPY AVAILABLE

ground-based platforms. A conducting tether of 20 km in length provides the means to perform active experiments on the space plasma on a scale not before possible. We invite you to participate in this important and exciting endeavor.

Burton I. Edelson
Associate Administrator for
Space Science and Applications

Prof. Luciano Guerriero
Director
Piano Spaziale Nazionale

Enclosures:
Appendix A - Guidelines for Proposal Preparation
Appendix B - General Instructions and Provisions

BEST COPY AVAILABLE

APPENDIX A

GUIDELINES FOR PROPOSAL PREPARATION

The following guidelines apply only to the preparation of proposals by potential investigators in response to the Announcement of Opportunity. The material presented is a guide for the prospective proposer, and is not intended to be all encompassing or directly applicable to the various types of proposals which can be submitted. The proposer must, however, provide information relative to those items applicable to his/her proposal or as otherwise required by the Announcement of Opportunity.

1. COVER LETTER

   A letter or cover page shall be forwarded with the proposal. It shall be signed by the investigator and an official, by title, of the investigator's organization who is authorized to commit the organization that is responsible for the proposal and its contents. In the case of proposals from countries other than the U.S.A. or Italy, an endorsement from the appropriate foreign governmental agency as to the proposal merit and the availability of sufficient funds to undertake the activity should accompany the proposal.

2. TABLE OF CONTENTS

   The proposal shall contain a table of contents. All pages must be numbered.

3. IDENTIFYING INFORMATION

   The proposal shall contain a short descriptive title for the investigation, the names of all investigators, and the name of the organization or institution. The full name of the Principal Investigator, his/her address with zip code, and his/her telephone number shall be included on the front page of the proposal.

4. ABSTRACT

   A one-page abstract should be included.

SECTION I - INVESTIGATION AND TECHNICAL PLAN

A. INVESTIGATION AND TECHNICAL PLAN

The investigation and technical plan generally shall contain the following:

1. Summary. A simple, concise statement about the investigation, the related experiment objective, its conduct, and the anticipated results.

BEST COPY AVAILABLE

2. Objectives and Significant Aspects.

   a. Briefly define the objectives, their value, and their relationships to past, current, and future efforts.

   b. Present the history of and the basis for the proposal and a demonstration of the need for such an investigation.

   c. Include a statement of present development in the discipline field.

3. Investigation Approach.

   a. Fully describe the concept of the investigation.

   b. Detail the method and procedures for carrying out the investigation.

B. INSTRUMENTATION

This section should describe all information necessry to plan for experiment development, integration, ground operations, and flight operations. This section must be complete in itself without need to request additional data. Failure to furnish and complete data may preclude evaluation of the proposal.

1. Instrument Description. This section should fully describe the instrumentation and indicate items which are proposed to be developed as well as any existing instrumentation. Performance characteristics should be related to the experiment objectives as stated in the proposal.

2. Instrument Integration. This section should describe all parameters of the instrument pertinent to the accommodation of the instrument in the spacecraft, Spacelab, or Shuttle Orbiter. These include, but are not limited to volumetic envelope, weight, power requirement, sensitivity to or generation of contamination (e.g. EMI, gaseous effuents), and data processing requirements.

3. Ground Operations. This section should identify requirements for pre-launch or post-launch ground operations support.

4. Flight Operations. This section should identify any requirements for flight operations support including mission planning. Operational constraints, viewing requirements, and pointing requirements should also be identified. Details of communications needs, tracking needs, and special techniques, such as extravehicular activity or restrictions in the use of control thrusters at stated times should be delineated. Special communications facilities that are needed must be described. Any special orbital requirements, such as time of month, time of day, phase of moon, and lighting conditions are

BEST COPY AVAILABLE

to be given in detail. Describe real-time ground support requirements and indicate any special equipment or skills required of ground personnel.

C. DATA REDUCTION AND ANALYSIS

Proposals shall contain a discussion of the data reduction and analysis plan, including the method and format. A section of the plan shall include a schedule for the submission of reduced data to the receiving point as specified in this Announcement.

D. CREW OPERATIONS AND TRAINING REQUIREMENTS

A description of the tasks required of each crew member should be provided, including the task duration and equipment involved. Indicate special training and/or skills necessary to provide the crew members with the capacity for performing the aforementioned tasks.

SECTION II - MANAGEMENT PLAN AND COST PLAN

A. MANAGEMENT PLAN

The management plan shall summarize the management approach and the facilities and equipment required.

1. Management

   a. The management plan shall set forth the investigator's approach for efficiently managing the work, the recognition of essential management functions, and the effective overall integration of these functions.

   b. The management plan shall give insight into the organization proposed for the work, including the internal operations and lines of authority with delegations, together with internal interfaces and relationships with NASA, the PSN/CNR, major subcontractors, and associated investigators. Likewise, the management plan usually reflects various schedules necessary for the logical and timely pursuit of the work accompanied by a description of the investigator's work plan and the responsibilities of the co-investigators.

   c. The plan shall describe the proposed method of instrument acquisition. Specifically, it shall include the following, as applicable:

      (1) The rationale for the investigator to obtain the instrument through or by his/her institution.

BEST COPY AVAILABLE

(2) The method and basis for the selection of a proposed instrument fabricator.

(3) Unique or proprietary capabilities of the instrument fabricator that are not available from any other source.

(4) Contributions or characteristics of the proposed fabricator's instrument that make it an inseparable part of the investigation.

(5) Availability of supporting personnel in the institution to successfully administer the instrument contract and technically monitor the fabrication.

(6) The status of development of the instrument, what additional development is needed and areas that need further design or in which unknowns are present.

(7) The method by which the investigator proposes to:

(a) Prepare instrument specifications;

(b) Review development progress;

(c) Review design and fabrication changes;

(d) Participate in testing program;

(e) Participate in final checkout and calibration;

(f) Provide for integration of instrument;

(g) Support the flight operations;

(h) Coordinate with co-investigators, project office, and other related investigations;

(i) Execute tasks for the assurance of safety, reliability, and quality; and

(j) Provide required support for payload specialist(s), if applicable.

(8) Planned participation by small and/or minority business in any subcontracting for instrument fabrication or investigation support functions.

2. Facilities and Equipment

Any major facilities, laboratory equipment, and ground support equipment (GSE) essential to the experiment in terms of its system and subsystems shall be indicated, distinguishing

BEST COPY AVAILABLE

insofar as possible between those already in existence and those that will be developed in order to execute the investigation. The outline of new facilities and equipment shall also indicate the lead time involved and the planned schedule for construction, modification, and/or acquisition of the facilities.

B. COST PLAN (U.S. INVESTIGATIONS ONLY)

The cost plan shall provide detailed estimates of the total investigation cost by major categories of cost.

1. The categories of cost shall include the following:

   a. Direct Labor. List by labor category, with labor hours and rates for each. Provide actual salaries of all personnel and the percentage of time each individual will devote to the effort.

   b. Overhead. Include indirect costs which, because of their incurrence for common or joint objectives, are not readily subject to treatment as direct costs. Usually this is in the form of a percentage of the direct labor costs.

   c. Materials. Give the total cost of the bill of materials including estimated cost of each major item. Include lead time of critical items.

   d. Subcontracts. List those over $25,000; specify the vendor and the basis for estimated costs. Include any baseline or supporting studies.

   e. Special Equipment. Include a list of special equipment and lead and/or development time.

   f. Travel. List estimated number of trips, destinations, duration, purpose, number of travelers, and anticipated dates.

   g. Other Costs. Costs not covered elsewhere.

   h. General and Administrative Expense. Include the expenses of the institution's general and executive offices and other miscellaneous expenses related to the overall business.

   i. Fee (if applicable).

BEST COPY AVAILABLE

2. Separate schedules, in the above format, shall be attached to show total costs allowable to the following:

   a. Definition Study Phase.

   b. Hardware Phase - Development, Test, Operations.

   Within each of these phases, as applicable, the schedules shall separately identify the elements of cost for the following:

   a. The Principal Investigator and other investigators.

   b. Instrument costs.

   c. Integration costs.

   d. Data reduction and analysis, including the amount and cost of computer time.

3. If the effort is sufficiently known and defined, a funding obligation plan shall provide the proposed funding requirements of the investigation by quarter and/or annum keyed to the work schedule.

BEST COPY AVAILABLE

APPENDIX B

GENERAL INSTRUCTIONS AND PROVISIONS

1. PROCUREMENT OF INSTRUMENTATION AND/OR GROUND EQUIPMENT

By submitting a proposal to NASA or PSN/CNR, the investigator and his institution agree that NASA or PSN/CNR has the option to accept all or part of the offerer's plan to provide the instrumentation or ground support equipment required for the investigation, or may furnish or obtain such instrumentation or equipment from any other source as determined by the selection official. In addition, NASA reserves the right to require use, by its selected investigators, of U.S. Government instrumentation or property that subsequently becomes available, with or without modification, that will meet the investigative objectives.

2. TENTATIVE SELECTION, PHASED DEVELOPMENT, PARTIAL SELECTIONS, AND PARTICIPATION WITH OTHERS

By submitting a proposal to either NASA or PSN/CNR, the investigator and his institution agree that NASA or PSN/CNR have the option to make a tentative selection which will be confirmed following successful completion of the experiment definition study and, in addition, in the case of investigations that are not entirely funded by NASA or by PSN/CNR, upon confirmation of the availability of adequate financial support by the proposer's funding agency.

Investigators should also understand that NASA and PSN/CNR may desire to select only a portion of their proposed investigation and/or that NASA and PSN/CNR may desire their participation with other investigators in a joint investigation, in which case the investigator will be given the opportunity to accept or decline such partial acceptance or participation with other investigators prior to a NASA and PSN/CNR selection. Where participating with other investigators as a team is agreed to, one of the team members will normally be designated as its team leader or contact point.

3. SELECTION WITHOUT DISCUSSION OR AFTER LIMITED DISCUSSION

The Governments of Italy and the U.S.A. reserve the right to reject any or all proposals received in response to this Announcement when such action shall be considered to be in the best interest of the respective Governments. Notice is also given of the possibility that any selection may be made without discussion or after limited discussion. It is therefore emphasized that all proposals should be submitted initially on the most favorable terms that the offerer can submit.

BEST COPY AVAILABLE

4. TREATMENT OF PROPOSAL DATA

The following will apply in the treatment of proposal data received in response to this Announcement:

A. Commercial and Financial Data

1. It is the policy of NASA and PSN/CNR to use commercial and financial data included in proposals for evaluation purposes only. This policy does not require that this kind of proposal data bear a notice.

2. Where it is the practice of an offerer or proposed subcontractor to treat certain commercial and financial data as a trade secret, and such data is protectable as a trade secret under law, that offerer may apply the "Notice" of Paragraph B below to those portions to be maintained as a trade secret.

3. In any event, commercial and financial data submitted to NASA and PSN/CNR in a proposal will be protected to the extent permitted under the law, either as a properly noticed trade secret, or as commercial or financial information received from a person and considered confidential or privileged.

B. Technical Data

It is the policy of NASA and PSN/CNR to use the technical data contained in any proposal submitted in response to this Announcement for evaluation purposes only. Where any of such technical data constitutes a trade secret under the law and the offerer, or potential subcontractor, desires to maintain trade secret rights in such technical data, the following "Notice" must be affixed to the cover sheet of the proposal specifying therein the pages of the proposal which contain trade secrets to be restricted in accordance with the conditions of the "Notice." Thereafter, it is the policy of NASA and PSN/CNR to protect such noticed technical data as a trade secret. NASA and PSN/CNR assume no liability for use or disclosure of any proposal technical data to which the "Notice" has not been applied.

1. For those proposing to NASA, the "Notice" should read:

NOTICE

Data on page(s) ____ of this proposal constitute a trade secret. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offerer, be used or disclosed other

BEST COPY AVAILABLE

than for evaluation purposes; provided, however, in the event a contract is awarded on this proposal, the Government may obtain in the contract additional rights to use and disclose this data.

2. For those proposing to PSN/CNR, the "Notice" should read:

NOTICE

Technical data contained in page(s) ____ of this proposals shall not be used or disclosed, except for evaluation purposes.

5. STATUS OF COST PROPOSALS (U.S. PROPOSALS ONLY)

The investigator's institution agrees that the cost proposal submitted in response to this Announcement is for proposal evaluation and selection purposes, and that following selection and during negotiations leading to a definitive contract, the institution will be required to resubmit a final cost proposal as required by law and regulation. U.S. proposers may execute a DD Form 633 (Contract Pricing Proposal) to fulfill this requirement.

6. LATE PROPOSALS

NASA and PSN/CNR both reserve the right to consider proposals or modifications thereof received after the submission deadline but prior to the date of selection, should such action be in the interest of the respective agencies.

7. DISCLOSURE OF PROPOSALS

NASA and PSN/CNR may wish to obtain outside assistance in evaluating the technical or scientific aspects of individual proposals. Special arrangements will be established for the appropriate handling of proposal information by outside reviewers. If the investigator or his institution wish to preclude NASA or PSN/CNR from employing outside reviewers, the investigator or his institution should so indicate in a covering letter accompanying the proposal. By submitting a proposal without such a letter, the investigator and his institution implicitly agree that NASA and PSN/CNR may have the proposal reviewed by outside specialists. If a proposer objects to the use of outside experts for purposes of proposal evaluation, NASA and PSN/CNR may be unable to consider the proposal.

BEST COPY AVAILABLE

8. INVENTION AND DATA RIGHTS

The topics of data rights, patent rights, copyrights, protection of proprietary information, and title to experimental equipment and materials, as appropriate, will be the subject of agreement upon selection, in accordance with NASA or PSN/CNR policies and regulations, as appropriate.

In instances where NASA totally or partially funds an investigation under a NASA contract, NASA is required by law to take title to inventions which may result from the work performed under the contract. The contractor would be granted a royalty-free license to practice the invention. The contractor, however, could petition for waiver of such title in accordance with NASA Patent Waiver Regulations 14 C.F.R. 1245.1, whereupon the Agency would give favorable consideration towards waiving title to the invention to the contractor subject to the reservation by the Government of a royalty-free license. As a general rule, the contract provides that NASA and the contractor can use and disclose, without restrictions, the data generated under the contract.

In instances where a joint project with NASA is undertaken, i.e., the investigtaor furnishes the investigation without charge to NASA and no transfer of funds takes place, NASA will obtain a royalty-free license to practice for U.S. Governmental purposes any investigations resulting from the investigation, together with the right to use and disclose the resulting data for U.S. Governmental purposes.

9. SOURCE OF SPACE TRANSPORTATION SYSTEM INVESTIGATIONS

Investigators are advised that candidate investigations for the Space Transportation System (STS) mission can come from many sources. These sources include those selected through the Announcement of Opportunity, those generated by NASA and PSN/CNR in-house research and development, and those derived from contracts and other agreements between NASA and/or PSN/CNR and external entities.

10. EQUAL OPPORTUNITY (U.S. PROPOSALS ONLY)

By submitting a proposal, the investigator and his institution agree to accept the below clause in any resulting contract:

EQUAL OPPORTUNITY (JUNE 1973)

During the performance of this contract, the Contractor agrees as follows:

BEST COPY AVAILABLE

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include but not be limited to the following: employment; upgrading; demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the Contractor's commitments under this nondiscrimination clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1976, and by the rules, regulations, and orders of the Secretary of Labor or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's noncompliance with the Equal Opportunity clause of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended, in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, or by rules, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

BEST COPY AVAILABLE

(g) The Contractor will include the provisions of Paragraphs (a) through (f) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for non-compliance; provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

11. EXPERIMENT EQUIPMENT FLIGHTWORTHINESS

By submitting a proposal, the investigator's institution agrees that if their proposal involves provision of flight experiment equipment and is selected, it will be required to comply with the flight mission's flightworthiness requirements. This must be accomplished by the organization managing the acquisition of the equipment. Flightworthiness requirements will be those to ensure necessary flight safety, and those to ensure a reasonable probability of satisfactory mission performance of the experiment equipment (reliability and quality assurance). Investigators selected to provide experiment equipment will be advised of the pertinent flightworthiness requirements for the mission and experimment in a timely manner by the NASA and/or PSN/CNR.

* U.S. GOVERNMENT PRINTING OFFICE: 1984-421-544:10

BEST COPY AVAILABLE

END

07-10-84